

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A prediction mode determination method comprising:

(a) grouping a plurality of ~~predetermined~~ prediction modes into a ~~predetermined~~ first number of groups;

(b) selecting one prediction mode for each of the first number of groups, respectively[[,]] performing predictions for a ~~predetermined~~ block in the selected prediction modes, and calculating prediction errors for the predictions performed in each of the selected prediction modes; and

(c) performing predictions for the ~~predetermined~~ block in other prediction modes belonging to a specific group among the first number of groups including which includes a prediction mode among the selected prediction modes with a smallest prediction error among the calculated prediction errors, calculating prediction errors ~~in~~ for the predictions performed in each of the other prediction modes, and deciding a prediction mode for the block according to the calculated prediction errors in the other prediction modes.

2. (currently amended): The method of claim 1, wherein in step (a), the plurality of prediction modes are partitioned into the ~~predetermined~~ first number of groups according to different directions of predictions.

3. (currently amended): The method of claim 1, wherein in step (a), according to different directions of predictions, a first prediction mode corresponding to a vertical direction and adjacent prediction modes corresponding to directions adjacent to the vertical direction are grouped into a first group, a second prediction mode corresponding to a horizontal direction and adjacent prediction modes corresponding to directions adjacent to the horizontal direction are grouped into a second group, and remaining prediction modes corresponding to remaining directions are grouped into a third group.

4. (currently amended): The method of claim 1, wherein in step (b), the selected prediction modes are a prediction mode corresponding to a vertical direction, a prediction mode corresponding to a horizontal direction, and a DC prediction mode (~~DC prediction mode~~) corresponding to a current location.

5. (currently amended): The method of claim 1, wherein step (c) comprises:
(c1) performing predictions for the ~~predetermined~~ block in the other prediction modes belonging to the specific group including which includes the prediction mode with the smallest prediction error and calculating prediction errors for the predictions performed in each of the other prediction modes; and

(c2) comparing the calculated prediction errors ~~of~~ in the other prediction modes to each other and outputting a prediction mode among the calculated prediction errors of the other prediction modes with a smallest prediction error according to a result of comparing the calculated prediction errors ~~in~~ of the other prediction modes to each other.

6. (currently amended): The method of claim 5, after step (c2), further comprising:

(c3) performing prediction for the ~~predetermined~~-block in a prediction mode corresponding to a prediction direction adjacent to a prediction direction of the prediction mode output in step (c2), and calculating a prediction errors-error for the prediction performed in the prediction mode corresponding to a-the prediction direction adjacent to a prediction direction of the prediction mode output in step (c2); and

(c4) comparing the calculated prediction ~~errors in-error of~~ the prediction mode corresponding to a-the prediction direction adjacent to a-the prediction direction of the prediction mode output in step (c2) to each other with the prediction error of the prediction mode output in step (c2) and outputting a prediction mode with a smallest prediction error according to a result of comparing the calculated prediction ~~errors in-error of~~ the prediction mode corresponding to a-the prediction direction adjacent to a-the prediction direction of the prediction mode output in step (c2) to each other with the prediction error of the prediction mode output in step (c2).

7. (currently amended): The method of claim 1, wherein the ~~predetermined~~-block is a luminance block.

8. (currently amended): The method of claim 1, wherein the prediction error is a residue value obtained by subtracting an original pixel value of the ~~predetermined~~-block from a predicted pixel value of the ~~predetermined~~-block, and is calculated using a predetermined cost function.

9. (currently amended): A prediction mode determination method comprising:

(a) performing predictions for a ~~predetermined~~ block in a vertical prediction mode corresponding to a vertical direction, a horizontal prediction mode corresponding to a horizontal direction, and a DC prediction mode corresponding to a current location, and calculating prediction errors ~~in~~ for the predictions performed in each of the respective modes; and

(b) performing predictions for the ~~predetermined~~ block in prediction modes corresponding to prediction directions adjacent to a prediction direction of a first prediction mode, among the vertical prediction mode, the horizontal prediction mode, and the DC prediction mode, with a smallest prediction error among the calculated prediction errors ~~in~~ for the predictions performed in the respective modes, calculating prediction errors ~~in~~ for the predictions performed in each of the prediction modes corresponding to prediction directions adjacent to a the prediction direction of a the first prediction mode ~~with the smallest prediction error among the calculated prediction errors in the respective modes~~, and selecting a prediction mode among the prediction modes corresponding to prediction directions adjacent to the prediction direction of the first prediction mode and the first prediction mode with the smallest prediction error among the calculated prediction errors in the prediction modes corresponding to prediction directions adjacent to a the prediction direction of a the prediction mode ~~with the smallest and the prediction error among the calculated of the first prediction mode errors in the respective modes~~.

10. (currently amended): The method of claim 9, after step (b), further comprising:

(c) performing predictions for the ~~predetermined~~ block in prediction modes corresponding to prediction directions adjacent to a prediction direction of the selected prediction

mode, calculating prediction errors for the predictions performed in each of the prediction modes corresponding to prediction directions adjacent to the prediction direction of the selected prediction mode, and selecting a prediction mode with a smallest prediction error among the calculated prediction errors ~~in~~ of the prediction modes corresponding to prediction directions adjacent to the prediction direction of the selected prediction mode and the prediction error of the selected prediction mode.

11. (currently amended): The method of claim 9, wherein each of the vertical prediction mode, the horizontal prediction mode, and the DC prediction mode is a 4x4 intra luminance prediction mode.

12. (currently amended): A prediction mode determination apparatus comprising:
a prediction unit[[,]] which performs prediction for a ~~predetermined~~ block in a ~~predetermined~~ different prediction modes, and outputs a prediction sample for each of the different prediction modes;

a prediction error calculator which calculates a prediction error for each of the prediction samples corresponding to the different prediction modes; and

a prediction error comparator, which compares the prediction errors corresponding to the different prediction modes received from the prediction error calculator ~~to each other~~, selects a prediction mode among the different prediction modes with a smallest prediction error according to a result of the compared prediction errors, and outputs the selected prediction mode.

13. (currently amended): The apparatus of claim 12, wherein the prediction unit selects one prediction mode among the different prediction modes for each of a plurality of groups partitioned according to different directions of predictions.

14. (currently amended): The apparatus of claim 12, wherein the prediction unit priority-performs predictions for the ~~predetermined~~ block in a vertical prediction mode corresponding to a vertical direction, a horizontal prediction mode corresponding to a horizontal direction, and a DC prediction mode corresponding to a current location.

15. (currently amended): The apparatus of claim 12, wherein the prediction error calculator calculates the prediction error (~~residue value~~) by subtracting an original pixel value of the ~~predetermined~~ block from a pixel value of the prediction sample, using a predetermined cost function.

16. (currently amended): The apparatus of claim 12, wherein the prediction unit receives ~~prediction mode information with a~~ the smallest prediction error and the corresponding prediction mode from the prediction error comparator, and performs secondary prediction for the ~~predetermined~~ block in prediction modes corresponding to prediction directions adjacent to a prediction direction ~~according to~~ of the received prediction mode ~~information~~.

17. (original): The apparatus of claim 12, wherein the block is a luminance block.

18. (currently amended): A computer readable medium having embodied thereon a computer program for implementing functions of a prediction mode determination method on a computer, said functions comprising:

(a) partitioning a plurality of ~~predetermined~~ prediction modes into a ~~predetermined~~ first number of groups;

(b) selecting one prediction mode for each of the first number of groups, respectively[[.]] performing predictions for a ~~predetermined~~ block in the selected prediction modes, and calculating prediction errors for the predictions performed in each of the selected prediction modes; and

(c) performing predictions for the ~~predetermined~~ block in other prediction modes belonging to a specific group among the first number of groups including which includes a prediction mode among the selected prediction modes with a smallest prediction error among the calculated prediction errors, calculating prediction errors ~~in~~ for the predictions performed in each of the other prediction modes, and deciding a prediction mode for the block according to the calculated prediction errors in the other prediction modes.

19. (new): The method of claim 1, wherein the plurality of the prediction modes comprises at least three different prediction modes, and the first number of groups comprises at least three groups respectively corresponding to each of the at least three different prediction modes, wherein step (b) comprises always performing at least three predictions for the block in the at least three different prediction modes.

20. (new): The method of claim 9, wherein step (a) comprises unconditionally performing predictions for the block in the vertical prediction mode, the horizontal prediction mode, and the DC prediction mode prior to calculating the prediction errors for the predictions performed in each of the respective modes.

21. (new): The method of claim 10, wherein step (c) is only performed if the first prediction mode is not selected in step (b).

22. (new): The apparatus of claim 12, wherein the different prediction modes comprise at least three prediction modes, and the prediction unit always performs the prediction for the block in each of the at least three different prediction modes.

23. (new): The computer readable medium of claim 18, wherein the plurality of the prediction modes comprises at least three different prediction modes, and the first number of groups comprises at least three groups respectively corresponding to each of the at least three different prediction modes, wherein step (b) comprises unconditionally performing at least three predictions for the block in the at least three different prediction modes.